ATOMIC ENERGY newsletter

THE FIRST AND ONLY AT[illegible] SERVICE

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Dear Sir:

Greater boldness and more scientific and technical daring should be brought to bear on the atomic energy program, the Joint Congressional Committee on Atomic Energy has now recommended to the USAEC. The recommendations were contained in a report issued by the Committee in Washington last week. The Committee also expressed itself as "not pleased with the progress" at the Knolls Atomic Power Laboratory, Schenectady, N.Y., which is operated for the USAEC by General Electric. The Laboratory has not yet started to build a nuclear reactor (the Committee said) although it has devoted five years to nuclear work. An intensified raw materials campaign "looking toward increased use of thorium as well as uranium" was urged by the Committee. (To date, the USAEC has bought only relatively small quantities of thorium, for research, chiefly from Lindsay Light & Chemical, Chicago, largest U.S. thorium producer. Thorium's place in atomic energy is the possibility of transmuting it into a fissionable material.)

The House of Representatives in Washington last fortnight sustained the action of its Appropriations Committee in reducing by some 50% (to $200,000,000) the original $484,000,000 supplemental appropriation sought by the USAEC for its new hydrogen bomb materials plant on the Savannah river, in South Carolina. The action was caused by charges of inefficiency and waste, at the Savannah project, where du Pont is the prime contractor. However, funds previously appropriated can run the project until Spring.

Two amendments to the Atomic Energy Act (1946) would permit the USAEC, with the approval of the President and the National Security Council, to exchange information on processing and producing fissionable materials with nations that do not threaten U.S. security. The amendments are now before Congress for its approval. These new provisions would be in addition to an existing agreement among the U.S., Britain, and Canada, permitting the exchange, of certain limited atomic data, excluding that for industrial or military purposes.

A further step has now been taken in the large expansion of the atomic energy program of the U.S.: (AEN-9/25/51 & 10/9/51; page 1, ea. issue: McMahon asks 6-fold atomic expansion). Last week, in a resolution adopted unanimously by the Joint Congressional Committee on Atomic Energy, the USAEC and the Department of Defense were asked to deliver, by Jan. 3rd, 1952, a detailed program for maximum expansion of the U.S. atomic energy program. Specifically, the Committee asked for estimates of the amount of money needed; extent and type of new facilities required; priorities in materials and manpower involved; and the impact on the economy of such an expansion.

The first of the new series of nuclear detonations occurred yesterday at the USAEC's test site, some seventy-five miles north of Las Vegas. Purpose of this series of explosions is to make additional tests of atomic weapons, some of which were involved in five nuclear explosions here last January and February.

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"The Atom is a Business"-A special digest of remarks by T. Keith Glennan, USAEC Commissioner, at news seminar, Iowa State College, Sept. 28th, 1951.

While the "atom business" is a tight government monopoly, our industrial operations are performed, for the most part, by private industrial concerns or educational institutions. Among the latter, there are Iowa State College, University of Chicago, University of California, and scores of others which are contractors to the USAEC. On the industrial side, du Pont is the contractor for the new installation in South Carolina (where hydrogen bomb materials will be made); General Electric runs the plutonium project at Hanford, Wash., and a reactor laboratory near Schenectady, N.Y.; Westinghouse is working on the reactor for the Navy's submarine; and Union Carbide operates the gaseous diffusion plants producing uranium-235, and the National Laboratory, at Oak Ridge, Tenn. Monsanto Chemical, Phillips Petroleum, American Smelting & Refining, American Cyanamid, National Lead, Standard Oil of California are other major names on our contractor list.

Employment figures show that the atom business is run largely by about 53,000 industrial and scientific people. We have 5,800 of these people directly on the USAEC payrolls. Our contractors have about 48,000 in the USAEC "factories" and laboratories. Then, there are more than 50,000 construction people working on the new plants and other facilities that are part of the USAEC's expansion program.

What is the magnitude of the atom business? It may be seen in the 44 parcels of land in 24 states and the District of Columbia that are occupied by USAEC projects. The total acreage is about 3,000 square miles. Another indicator of the size of the atom business are the three "company towns" of Oak Ridge, Tenn. (pop. 31,000); Richland, Wash. (pop. 24,000); and Los Alamos, N.M. (pop. 13,000). The sole support and reason for existence of these towns are the atomic projects there; operation of these towns accounts for about 5% of our budget.

On the financial side, the Manhattan Engineer District (World War II atomic energy operator), spent 2 billion dollars. From the time the USAEC took over in 1947, through 1950, it spent 1.8 billion dollars. For the fiscal year that ended last June 30th, Congress voted the USAEC slightly over 2 billion dollars. And by next June, upwards of 2 billion dollars more will have been appropriated. That adds up to around 8 billion dollars spent or to be committed for plant and operating expenses.

Concerning atomic materials: The entire operation of the atomic program is dependent on uranium ore. Now, a substantial portion of our uranium comes from the Belgian Congo, and Canada. However, production within the U.S. is playing an increasingly important role, actually surpassing Canadian production at present.

This ore is processed in what we call the feed material chain. The work is done in a number of private industrial plants about the country. But to speed this up, and provide additional capacity, we are now building a 54 million dollar processing plant at Fernald, Ohio--near Cincinnati--with National Lead the operating contractor.

The end product of this processing activity emerges in two forms: natural uranium metal, and the gaseous uranium hexafluoride. The uranium metal goes to Hanford's reactors, where the usable end product here is fissionable plutonium. The uranium in gaseous form goes to Oak Ridge, where, in the gaseous diffusion process, the more useful uranium-235 atoms are separated from the more numerous uranium-238 atoms.

As to the utilization of fissionable materials: today, the emphasis is on weapons. We are working on development of the hydrogen bomb; on improved types of atomic bombs; and on atomic warheads for artillery and guided missiles. We have found that the atomic weapons exploded at our Eniwetok Atoll testing ground in the Pacific were several times more powerful than the bombs dropped on Hiroshima and Nagasaki. Right now, we are producing such atomic weapons on an industrial basis.

And the power possibilities of the atom are not being neglected. Four groups of U.S. firms now hold contracts with the USAEC to see if it is feasible to build a nuclear reactor that could produce power commercially, at a profit. The idea is that the USAEC would loan them the uranium; they would make some plutonium in their reactor and sell that back to us; then--as a by-product, so to speak--they would convert the immense heat generated in manufacturing plutonium into power.

ATOMIC PATENT DIGEST...latest U. S. applications & grants...

Applications - Complex compounds of uranium and alpha substituted beta diketones. Water insoluble chelate complex compounds of hexavalent and tetravalent uranium. U. S. Pat. Application No. 643,460 filed Jan. 25, 1946. Assigned to United States of America (USAEC).

Method of preparing thorium compounds. The disclosure embraces binary compounds of thorium and non-metal of the groups III, IV, V, VI, and VII of the Mendeleeff periodic table which can be prepared at relatively low temperatures, suitably between 200-deg. C., and 500-deg. C., and usually between 350-deg. and 400-deg. C., by reacting a hydride of thorium with a gaseous material or compound which contains said non-metal either in elemental form or as a compound of said non-metal, and especially the hydrogen, halogen, or sulfur compounds thereof. U. S. Pat. Application No. 787,850 filed Nov. 24, 1947, by Amos S. Newton and Oliver Johnson, Berkeley, Calif.

Patents Available for Licensing- Consisting of 25 U.S. Government-owned patents, developed in the course of nuclear research, the following group is available for royalty-free use (on a non-exclusive basis). Inquiries should be made to the Chief, Patent Branch, USAEC, Washington 25, D.C. (1) Electrolytic production of fluorine. Pat. No. 2,506,438. (2) Carrier for radioactive slugs. Pat. No. 2,514,909. (3) Method of preparing uranium pentafluoride. Pat. No. 2,567,145. (4) Preparation of beryllium nitride. Pat. No. 2,567,518. (5) Pressure monitoring device. Pat. No. 2,567,519. (6) Zirconium and hafnium recovery and purification process. Pat. No. 2,567,661. (7) Apparatus for the measurement of radioactivity. Pat. No. 2,567,668. (8) Fluorination of high molecular compounds. Pat. No. 2,567,759. (9) Rotary shaft driven tappet. Pat. No. 2,568,061. (10) Production of dichlorododecafluoroheptane and derivatives thereof. Pat. No. 2,568,642. (11) Fluorination process. Pat. No. 2,568,660. (12) Method of forming uranium monocarbide. Pat. No. 2,569,225. (13) Improved electronic filter circuit. Pat. No. 2,569,232. (14) Organic fluorine composition and method of making. Pat. No. 2,569,644. (15) Electrical simulator. Pat. No. 2,569,646. (16) Drill tool. Pat. No. 2,569,854. (17) Recovery of carnotite from its ores. Pat. No. 2,570,119. (18) Process for recovery of pitchblende and similar uranium minerals from ores of same by special flotation process. Pat. No. 2,570,120. (19) Catalytic vapor phase fluorination apparatus. Pat. No. 2,570,435. (20) Ambient pressure responsive clamping means. Pat. No. 2,570,984. (21) Adsorption separation of zirconium and hafnium. Pat. No. 2,571,237. (22) Sampler for highly radioactive substances. Pat. No. 2,571,302. (23) System for determining tube characteristics. Pat. No. 2,571, 439. (24) Preparation of organic materials. Pat. No. 2,571,926. (25) Process for prodction of radioactive iron. Pat. No. 2,571,965.

BUSINESS BRIEFS...from nuclear energy enterprises...

Commercial power- Exploratory studies are being actively continued by the four groups which are investigating the practicability of business and industry building and operating nuclear reactors for the production of fissionable material and power. (p. 2 this NEWSLETTER). The four groups comprise: (1) Commonwealth Edison Co., Public Service Co. of Northern Illinois, and their consultants, Sargent & Lundy, of Chicago. (2) Pacific Gas & Electric Co., and the Bechtel Corp., San Francisco. (3) Monsanto Chemical Co., St. Louis, and the Union Electric Co., of Missouri, St. Louis. (4) Dow Chemical Co., Midland, Mich., and the Detroit Edison Co., Detroit. Under their agreement with the USAEC, these groups are studying the USAEC's nuclear reactor development activities to: (1) Determine the engineering feasibility of their designing, constructing, and operating a materials and power producing reactor, (2) Examine the economic and technical aspects of building this reactor in the next few years, (3) Determine the research and development work needed, if any, before such a reactor project can be undertaken, (4) Offer recommendations in a report to the Commission concerning such a reactor project, and industry's role in undertaking and carrying it out. (Maximum time permitted for the study is 12 months).

Construction bids- With a low bid of $2,840,000, L.W. Hoffman, Portland, Ore., was apparent low bidder for construction of the pile technology and radio-metallurgy buildings at Hanford Works, Richland, Wash. The two buildings are part of the large laboratory expansion which has been underway at this plutonium production project.

NEW BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Minerals Yearbook. This newest volume, issued annually by the U.S. Bureau of Mines, is for 1949. Covers production, distribution, and consumption of mineral commodities, as well as basic data of the mineral industry in 1949. A chapter is devoted to uranium, radium, and thorium. (All of the 85 chapters are available as individual "preprints" from the Sup't. of Documents at from 5 to 30 cents each.) 1662 pages.--Superintendent of Documents, Washington 25, D.C. ($4.50)

Uptake and Effect of Radiophosphorous in Mosquitoes. Work done at U. S. Chemical Corps., Medical Div., Army Chemical Center, Md. with radiophosphorous for use in mosquito flight range studies and to determine the optimum method for mosquito rearing. 22 pages. Report No. PB-104543.--Library of Congress, Photoduplication Serv., Wash. 25, D.C. (On microfilm; $2.00 . Photostatted; $3.75)

A Short History of Radioactivity, by T. W. Chalmers. A semi-technical approach. 78 pages.--The Engineer, London, England. (8s. 6d.)

Labeled Atoms, by Raymond Glascock. The use of radioactive and stable isotopes in biology and medicine. One of the "Sigma introductions to science". 227 pages. --Sigma Books, Ltd., London, England. (10s. 6d.)

Radiations from Radioactive Substances, by Sir Ernest Rutherford. A reprint (with minor corrections) of this classic work in the history of radioactivity, first published in 1930.--Cambridge University Press, Cambridge (England). (55s.)

Notes-The following papers are available from the National Research Council, of Canada, Ottawa: (1) Beta-ray thickness gauges, by W. R. Dixon. 15 pages. No. PB-104520; 15¢. (2) Detection of radioactivity with scintillation counters, by George Cowper. 11 pages. 15¢ (3) Isotopic analysis of deuterium oxide by density determinations, by I. A. W. Morrison, B. Smith, R. Walsh. 11 pages 15¢. (4) Relation of apparent to true pH in deuterium solutions, by R. G. Hart. 14 pages. 15¢.

This paper is available from Library of Congress, Photoduplication Serv., Wash. 25, D.C. (Microfilm; $1.25. Enlarged print; $1.50): Valve for glass blowing on apparatus contaminated with radioactive or toxic substances, by F. T. Birks, Atomic Energy Research Establishment, Harwell, Eng.

Geological and mineral reports dealing with uranium in the U.S. are now to be made available for examination throughout the U.S. at the USAEC depository libraries (certain public and university libraries), as well as at the USAEC offices in Washington, D.C.; New York, N.Y.; Denver, Colo.; Spokane, Wash.; and Grand Junction, Colo. They may also be seen at the U.S. Geological Survey Offices in Washington, D.C.; Denver, Colo.; Salt Lake City, Utah; and the Mines Bldg., U. of Arizona, Tucson. This first group of reports covers exploration by the USAEC and the USGS (for the Commission), in Arizona, Colorado, Montana, New Mexico, and Utah, as well as some results of mineralogical studies. The uranium reports include: (a) Uranium Deposits in Arizona, Dec. 1950; (b) Free Enterprise Uranium Prospect, Jefferson County, Mont., April, 1950; (c) Reconnaissance of Basin-Boulder-Clancey Area, Montana, 1950; (d) Reconnaissance examination of copper-uranium deposits west of the Colorado River, Nov., 1950; (e) Preliminary report on some uranium deposits along the west side of the San Rafael swell, Oct., 1950; (f) Geologic report on Happy Jack mine, White Canyon, Utah, Dec., 1950; (g) Annie Laurie prospect, Santa Cruz County, Ariz., Jan., 1950; (h) Geology of uranium deposits--a condensed summary, May, 1951; (i) Reconnaissance of Henry mountains area, Wayne and Garfield counties, Utah, April 5, 1951; (j) Progress report, Wamsutter (Red Desert) area, Wyoming, Aug., 1951; (k) Progress report, Colorado front range area, Aug. 30, 1951; (l) Forty-niner, King Solomon Ridge, and West End claims near Clancy, Jefferson County, Montana, Aug., 1950; (m) Interim report, Lost Creek, Schroeckingerite deposits, Sweetwater County, Wyoming, Oct., 1950; (n) Catalog of study material of radioactive minerals, Oct, 30, 1950; (o) Design of Model V transmission fluorimeter, Dec., 1950; (p) Summary of research work of the trace elements section , geochemistry and petrology branch, for period Apr. 1, 1948--Dec. 31, 1950; (q) Fluorimeter for solutions, Apr. 1951; (r) Photometric method for the estimation of the oil yield of oil shale, May, 1951; (s) Hydrothermal uranothorite in fluorite breccias from the Blue Jay Mine, Jamestown, Boulder County, Colo., Apr. 1951.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

New Products Available-Two new model absorption and backscatter beta gauges for the low cost determination of the weight per unit area of sheet materials; incorporate improvements based on experience gained from a number of this manufacturer's gauges now in succesaful use in several process industries. (Absorption beta gauges determine weight changes in such sheet material as paper, plastics, rubber, thin metals, etc., by means of a small beam of beta rays, emitted from a sealed radioactive source, and which pass through the sheet to be measured. If the density of the material is maintained constant, the meter can be calibrated in units of thickness, thus making the gauge a sensitive thickness control instrument. Backscatter beta gauges offer advantages for many installations because they are mounted on one side of the sheet only, and hence can be used where the material must be gauged as it passes over a calendaring roll, or other backing surface. Although this manufacturer's backscatter gauges use the same console and recording apparatus as absorption types, they work on a slightly different principle.)--Tracerlab, Inc., Boston 10, Mass.

Slide rule for radioactivity computations; the defactor calculator. To compute decay factors, correction factors, half-lives, as well as computations related to other exponential processes, such as decay, growth, energy absorption, etc. No mathematical tables required, no special constants to remember. Said to be simpler to use, and results more accurate, than with a conventional slide rule.--J. L. Herson, 3000 Conn. Ave., N.W., Wash. 8, D. C.

Developments-A direct reading quartz fiber survey instrument for the detection and measurement of radioactivity has now been developed at Argonne National Laboratory under the direction of Francis R. Shonka. A quartz fiber electrometer of high sensitivity, the survey meter measures radiation intensity from 0-100 mr/hr, and when inverted (throwing a hinged resistor into the circuit) measures from 0-50 r/hr. The instrument is 6" high, 2" wide, 4" thick, and weighs about ½ pound. In commenting on the new instrument, Dr. Shonka said, "It possesses such advantages as ease of operation, long life, direct reading, and the ability to measure radiation intensity in more than one range without the need of external switches or auxiliary equipment."

A special instrument, for studying and photographing radioactive materials, has been built by the American Optical Co., Buffalo, for use at Knolls Atomic Power Laboratory, the General-Electric-operated nuclear research laboratory, Schenectady, N.Y. The instrument is a special misroscope for examining the structure of metals, combined with camera, periscopes and an illuminating system, in such an arrangement that light may be admitted to a test chamber, but radiation from the radioactive materials in the chamber cannot reach the operator of the instrument. This is accomplished through an offset lense system which admits light (from an arc lamp outside the chamber) for illuminating the specimen. Another offset lense system transmits the image to the operator. Remote control is employed to adjust the specimen on the microscope stage. Up to 1,000 diameters magnification is possible.

Notes-Nuclear physics is a little-tapped field in the measurements industry, I. F. Kinnard, manager of engineering for the General Electric Meter and Instrument Department recently told an instrument specialists conference at the G-E measurements laboratory, Lynn, Mass. Even though extremely accurate and dependable measuring devices are now available and meet present-day needs, the future use of atomic power to generate electricity, or to run ships or aircraft, will introduce new requirements in the science of measurement, he stated. Great strides will be taken in the development of new instruments to assure the most efficient and reliable operation of atomic power plants, Kinnard said, noting that this development work should be given important priority so that new applications of atomic energy are not delayed.

Victoreen Instrument Co., Cleveland, Ohio, manufacturers of radiation detecting instruments, has completed arrangements to enlarge its facilities. In this expansion, the firm will take over an additional 15,000 sq. ft. of plant space at its number 1 plant at 5806 Hough Ave., Cleveland.

Sincerely,

The Staff
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